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BEFORE THE ARIZONA CORPORATION COMMISSION

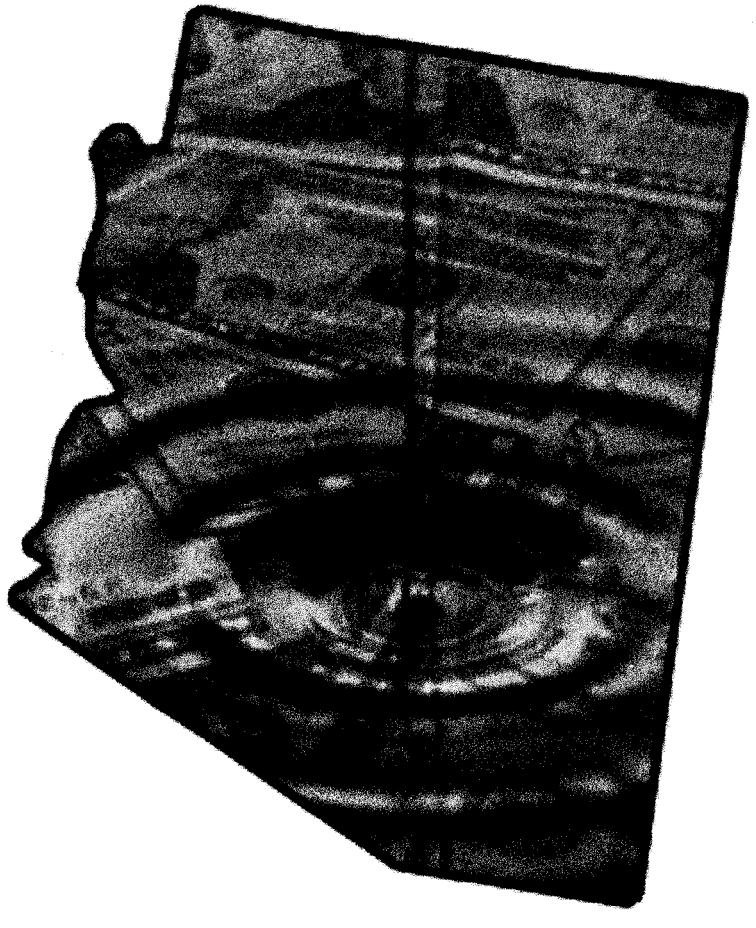
IN THE MATTER OF THE APPLICATION OF MONTEZUMA RIMROCK WATER COMPANY, LLC FOR APPROVAL OF FINANCING TO INSTALL A WATER LINE FROM THE WELL ON TIEMAN TO WELL NO. 1 ON TOWERS.	Docket No. W-04254A-12-0204
IN THE MATTER OF THE APPLICATION OF MONTEZUMA RIMROCK WATER COMPANY, LLC FOR APPROVAL OF FINANCING TO PURCHASE THE WELL NO. 4 SITE AND THE COMPANY VEHICLE.	Docket No. W-04254A-12-0205
IN THE MATTER OF THE APPLICATION OF MONTEZUMA RIMROCK WATER COMPANY, LLC FOR APPROVAL OF FINANCING FOR AN 8,000-GALLON HYDRO-PNEUMATIC TANK.	Docket No. W-04254A-12-0206
IN THE MATTER OF THE RATE APPLICATION OF MONTEZUMA RIMROCK WATER COMPANY, LLC.	Docket No. W-04254A-12-0207
JOHN E. DOUGHERTY, COMPLAINANT, V. MONTEZUMA RIMROCK WATER COMPANY, LLC RESPONDENT	Docket No. W-04254A-11-0323
IN THE MATTER OF THE APPLICATION OF MONTEZUMA RIMROCK WATER COMPANY, LLC FOR APPROVAL OF A RATE INCREASE.	Docket No. W-04254A -08-0361
IN THE MATTER OF THE APPLICATION OF MONTEZUMA RIMROCK WATER COMPANY, LLC FOR APPROVAL OF A FINANCING APPLICATION.	Docket No. W-04254A -08-0362 DECISION NO. 74504 **WIFA** **WATER AND WASTEWATER SERVICE PRINCING IN ARIZONA REPORT**

ORIGINAL

Water and Wastewater Service Pricing in Arizona:

2013-14 Rates Survey Results

This document details the results of a survey of drinking water and wastewater rates and rate structures conducted by the Water Infrastructure Finance Authority of Arizona and the Environmental Finance Center at the University of North Carolina, Chapel Hill in 2014. Rates and rate structures are analyzed for utilities throughout the State of Arizona. In addition to this report, the EFC produced comprehensive water and wastewater rate tables, rate sheets of individual utilities, and an interactive Rates Dashboard designed to allow the user to compare residential rates among groups of utilities and analyze the affordability of services and the extent to which the utilities are financially sustainable. To access these resources, please visit http://www.azwifa.gov and http://www.efc.sog.unc.edu.



September 2014

UNC ENVIRONMENTAL FINANCE CENTER

WIFA

About the Environmental Finance Center

The Environmental Finance Center (EFC) at the University of North Carolina (UNC), Chapel Hill is part of a network of university-based centers that work on environmental issues, including water resources, solid waste management, energy, and land conservation. The EFC at UNC partners with organizations across the United States to assist communities, provide training and policy analysis services, and disseminate tools and research on a variety of environmental finance and policy topics.

The Environmental Finance Center at the University of North Carolina, Chapel Hill is dedicated to enhancing the ability of governments to provide environmental programs and services in fair, effective, and financially sustainable ways.

Acknowledgements

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This report is a product of the Environmental Finance Center at the University of North Carolina, Chapel Hill. Findings, interpretations, and conclusions included in this report are those of the authors and do not necessarily reflect the views of EFC funders, the University of North Carolina, the School of Government, or those who provided review.

We are grateful to the Water Infrastructure Finance Authority of Arizona for funding this research.

Additional thanks are extended to our partners for reviewing the draft report: the Arizona Municipal Water Users Association; the League of Arizona Cities and Towns; and the Northern Arizona Municipal Water Users Association.

Cover photo designed by Alexandra Kay.

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Water and Wastewater Service Pricing in Arizona

SUMMARY

Purpose of the Report

Water and wastewater rate setting is one of a utility's most important environmental and public health responsibilities. Water and wastewater rates ultimately determine how much revenue a community will have to maintain vital infrastructure. The purpose of this report is to support utility financial management and pricing efforts by providing a detailed survey of current statewide drinking water and wastewater pricing and financial trends. This report represents a collaborative effort between the Water Infrastructure Finance Authority of Arizona (WIFA) and the Environmental Finance Center (EFC) at the University of North Carolina at Chapel Hill.

In addition to this report, tables of each utility's rates and key components of their rate structures are available online at http://www.efc.sog.unc.edu. WIFA and the EFC are also pleased to offer a free interactive Arizona Water and Wastewater Rates Dashboard that combines utility financial, physical and customer characteristics with the capability of comparing and benchmarking rates among utilities that are similar in characteristics in various categories. The dashboard can be accessed at http://www.efc.sog.unc.edu/project/utility-financial-sustainability-and-rates-dashboards.

Five Myths about Pricing

There are many oversimplifications and bits of "conventional wisdom" in the world of water finance and pricing which don't necessarily hold up upon deeper investigation. Some of the myths dispelled by the analysis in this report include:

1. **MYTH: Higher rates are bad.** Higher rates often do not necessarily reflect poor or inefficient management. In fact, data show that some utilities with low rates do not generate sufficient revenue to properly maintain their system's assets, which could ultimately lead to long-term adverse cost and service impacts. Pressure to maintain low rates has the potential to force utilities to run a deficit or avoid making necessary operational and capital expenditures. Some utilities may have low rates because they have not re-examined their rate structures in many years, and their pricing structure may not support key finance and policy goals such as promoting conservation or maintaining affordability.

2. **MYTH: Comparing rates is simple.** An examination of rates and rate structures will only tell part of the story, and there are many different methods of comparing pricing. Ideally, rates should reflect the cost of providing service. Cost of service depends on diverse factors including geographic location, size of treatment facilities, customer base, age of assets, site-specific regulatory requirements, type of water supply, and quality of source water and receiving waters. Two neighboring utilities with similar customer bases may have very different costs that justify very different rate structures and rates. Therefore, policy decisions drawn from the comparative information should also consider the many other factors listed above. Furthermore, figuring out the

most pertinent factors to compare can be a challenge. For example, the EFC's analysis revealed that in many cases, when comparing two utilities, one utility's rate may be higher at 4,000 gallons, but lower at 8,000 gallons. Comparing rates among utilities is really just a starting point for a more in-depth analysis.

3. **MYTH: Pricing is simple.** Arizona utilities employ a tremendous variety of pricing structures. Utilities show wide variation in how they set base charges, design block structures, and calculate wastewater charges (i.e. with or without caps, based on monthly water use or winter water use, or not on water use at all). Utilities have many design choices and should be thoughtful in customizing their rate structure to serve their specific needs as they evolve in time, rather than maintaining outdated rate structures or copying their neighbor's rate structure.

4. **MYTH: Promoting conservation requires increasing block rate structures.** Many utilities are facing water supply challenges and are looking for ways to use pricing structures to promote conservation. Many different types of pricing structures can be adopted to encourage conservation; some of these are quite complicated and some are very simple. Increasing block or increasing tier price structures are sometimes heralded as the solution to conservation rate setting, but the EFC's analysis clearly shows that some utilities with simpler rate structures (such as uniform rates) sent customers stronger conservation price signals than other utilities with increasing block structures. In fact, many of the utilities using increasing block rate structures had the least effective pricing signals in the State of Arizona. Rather than focusing on rate structures alone, utilities should consider all aspects of pricing. Above conservation, utilities must determine if their rates are set to truly reflect their costs, and make sure that rates are not artificially low.

5. **MYTH: Water and wastewater services are cheap and affordable, or conversely, water is too expensive.** Both of these generalizations are common and both are equally mythic based on what actually occurs throughout the state. When determining the affordability of rates, utilities often focus on the average or median price for the average household across the state or an entire utility service area, but this practice can mask the financial reality for some households. The EFC's research shows that the price for water across the State of Arizona is relatively low compared to other parts of the country and compared to the price for other less essential consumer goods. However, there are still pockets across the state where the price of water and wastewater service poses a significant financial burden for lower income customers.

Survey Methodology

Rate sheets and annual financial reports were collected by WIFA and the EFC from water and wastewater utilities throughout the State of Arizona during the spring of 2014. Base charges, volumetric rates, and recurring surcharges that provide revenue to the water and/or wastewater enterprise funds are included in our analysis; taxation or charges for other services that do not provide revenue to the water and/or wastewater enterprise funds are excluded from our analysis.

Over the course of this survey, approximately 417 water and wastewater utilities were contacted by the EFC via email or other means. Through contacts with utilities and research of public data, the EFC obtained rate schedules and annual financial reports, which are public data, for 373 utilities (89 percent). These utilities provide services for more than 95 percent of the population served by all public community water systems in the state (as per the Safe Drinking Water Information System maintained by the U.S. Environmental Protection Agency and the State of Arizona). Table 1 describes the utilities that participated in this survey. Some utilities use more than one rate structure for different portions of their service areas, raising the total number of rate structures in our sample to 407. Copies of the 407 rate structures of those participating utilities are available online at http://www.efc.sog.unc.edu/project/arizona-water-and-wastewater-rates-and-rate-structures.

Table 1: Participating Utilities in the Survey with Rates Data (Rates Effective May 2014)

Institutional Arrangement	Provides Water and Wastewater	Provides Water Only	Provides Wastewater Only	*Total*
Municipality	55	8	12	***75***
County/District	3	41	7	***51***
Authority/Sanitary District	1	0	16	***17***
Association/Co-Op/Non-Profit	0	19	0	***19***
For-Profit	19	178	14	***211***
Total Number of Utilities	***78***	***246***	***49***	***373***
Number of Rate Structures	***84***	***271***	***52***	***407***

OVERVIEW OF RATES AND RATE STRUCTURES

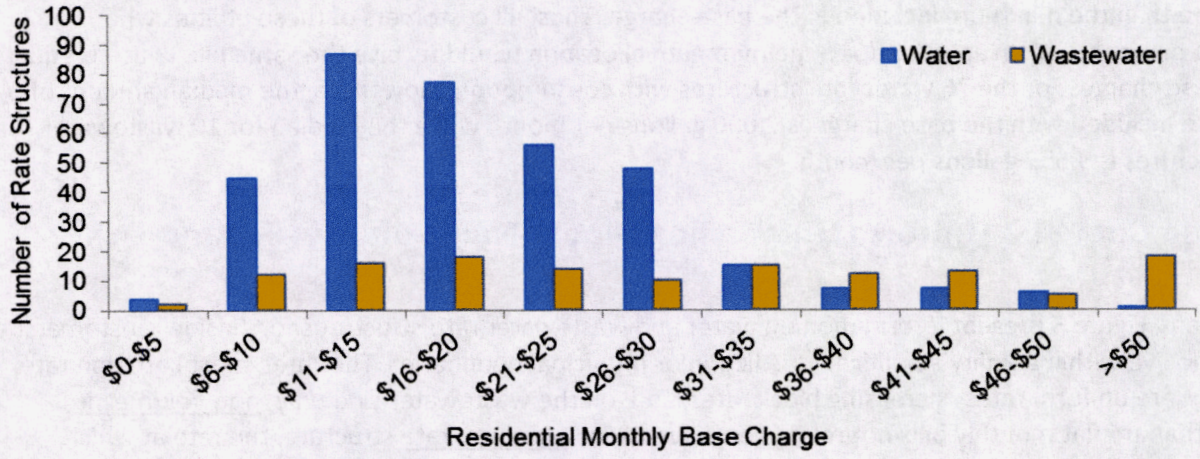
Utilities employ a range of rate structures to determine what their customers pay. Almost all utilities use a combination of base charges and variable charges in their rate structures. There is considerable variation in how these are calculated and how they are charged for different classes of customers.

Base Charges

Base charges contribute to revenue stability because they do not vary from month to month, regardless of consumption. Utilities have different philosophies about what this charge should cover with some using these charges to primarily recover customer service costs (meter reading and billing) and others using them to cover fixed costs including all or the majority of their debt service costs.

Figure 1 shows the range of residential base charges applied in all rate structures analyzed statewide. Base charges ranged from $0 to $79/month for water and $95/month for wastewater across the state. In general, wastewater base charges exceed water base charges. The median[1] base charges are presented in Table 2. The median base charge applied by utilities in 2014 is $18.00 per month for water and $28.70 per month for wastewater. For combined utilities, the median combined water and wastewater base charge is $44.70 per month.

Figure 1: Monthly Base Charges among 355 Water and 136 Wastewater Rate Structures



While nearly every rate structure (99 percent) has a base charge, their amounts vary by utility size as shown in Table 2. The largest utilities generally have smaller base charges than the smallest utilities, which may be a reflection of the fact that larger utilities have broader customer bases that provide a more stable revenue stream and thus can charge lower base charges per customer. However, large utilities sometimes have base charges higher than medium sized utilities, and this may be a reflection of the fact that some large wastewater systems carry significant debt and may design base charges to cover all or significant portions

[1] Most of the statistics reported in this report refer to *medians*. Exactly half of the rate structures in the sample have a value that is equal to or greater than (or equal to or lower than) the median value. The median is preferred over the average because averages are influenced by exceptionally high or low values whereas medians are not.

of debt obligations. Smaller utilities may, on average, have less stable customer consumption and, therefore, decide to shift a greater portion of their operating costs into the base charge.

Table 2: Monthly Base Charges in Water and Wastewater Rate Structures, by Utility Size

	Water Rate Structures			Wastewater Rate Structures		
	Total Number of Structures	Number with Base Charge	Median Base Charge	Total Number of Structures	Number with Base Charge	Median Base Charge
Statewide	***355***	***353***	***$18.00***	***136***	***135***	***$28.70***
By Service Population*						
1 – 999	169	167	$19.01	13	13	$35.00
1,000 – 2,499	52	52	$19.75	13	13	$29.50
2,500 – 4,999	30	30	$18.20	8	8	$31.40
5,000 – 9,999	21	21	$16.90	8	8	$12.03
10,000 – 24,999	29	29	$17.00	11	11	$25.50
25,000+	35	35	$14.19	27	27	$19.07

* Service population is estimated for 338 out of the 407 rate structures analyzed.

A minority of rate structures (22 percent of water and 7 percent of wastewater rate structures) includes a minimum amount of water consumption or wastewater volume with the base charge (i.e.: a consumption allowance). For these utilities, the variable portion of the rate structure only takes effect when a customer uses more than the minimum included in the base charge. Thus, all customers of these utilities who consume or dispose of an amount up to the minimum allocation would receive the same bill, which is equal to the base charge. For the 76 water rate structures with consumption allowances, the median amount of allowance included with the base charge is 2,000 gallons per month while the median for 10 wastewater rate structures is 3,552 gallons per month.

Variable Charges: Uniform, Increasing Block, Non-Volumetric, and Other Rate Structures

Figure 2 and Figure 3 present information on water and wastewater rate structures for "inside" customers: those who live within a utility's political jurisdiction or municipal boundaries. The three most common rate structures are uniform rates, increasing block rates, and, on the wastewater side only, non-volumetric charges that are flat monthly bills not related to volumes. In a uniform rate structure, the rate at which water or wastewater is charged for each unit of use does not change as the customer uses more water. In an increasing block structure, the rate increases with greater water consumption. Other volumetric rate structures used in Arizona include decreasing block rates, a hybrid of increasing and decreasing blocks where rates increase or decrease for specific targeted blocks of consumption, seasonal rate structures, rates that are capped at a maximum billable consumption amount, and tiered flat fees.

Wastewater bills are either flat charges that do not vary from month to month, or calculated based on water use level in one of two ways. The more common method is to have wastewater bills for a billing period calculated based on the amount of metered water consumption during that period; however, several wastewater utilities studied use rate structures where the wastewater charge for a given period is not based on water use for that period, but rather is based on water consumed during low consumption periods (usually the winter). This is done to reflect the fact that much of the water used in summer months is for outdoor use and does not enter the wastewater system. Other utilities place a cap on residential

wastewater consumption. For example, if a utility caps their wastewater bill at 20,000 gallons, a customer that uses 25,000 gallons of water will only be charged for 20,000 gallons of wastewater volume.

Figure 2: Residential Water Rate Structures (n=355)

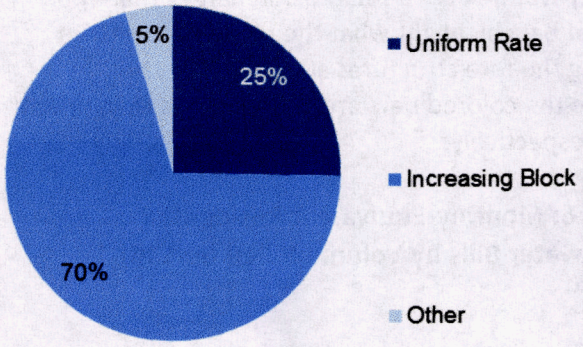
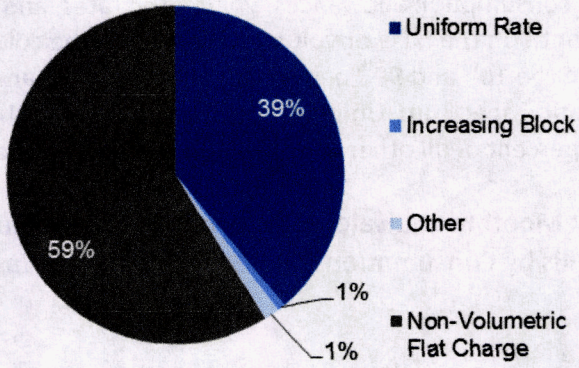
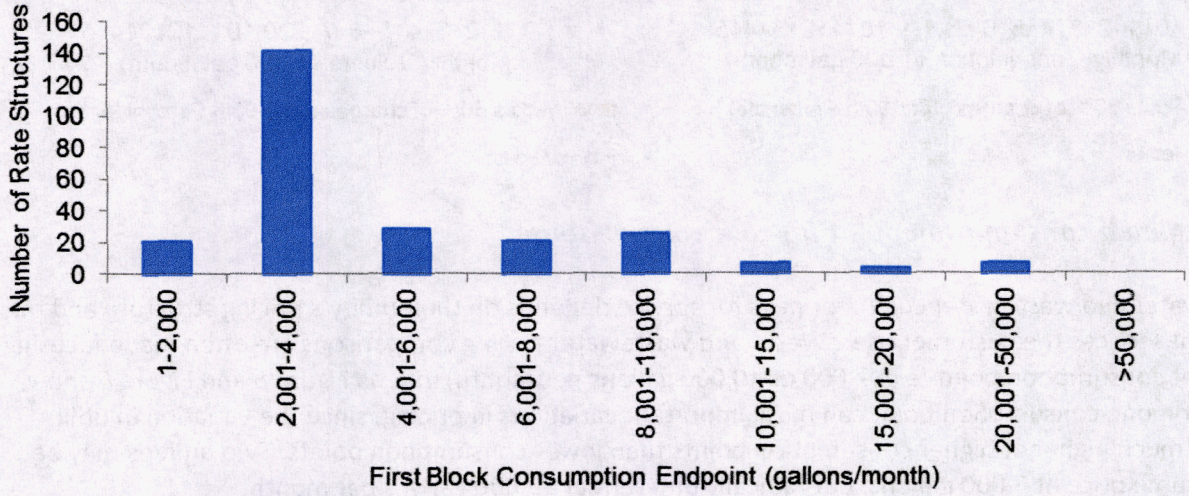


Figure 3: Residential Wastewater Rate Structures (n=136)



Utilities with block rate structures have to decide where to delineate the block – in other words, when the unit price of water changes. Figure 4 shows the various ranges of first block consumption endpoints for all water block rate structures, and the number of utilities applying endpoints within each range. After the endpoint, the customer starts paying more dollars per unit of water used.

Figure 4: Maximum Quantity in the First Block among 257 Water Residential Block Rate Structures



Many water and wastewater utilities use the same rate structure for residential, commercial, and industrial customers, but some have separate rates for different customer classes. In this survey, 27 percent of water utilities have a separate rate structure for their commercial customers, and a fraction of these utilities also has a separate structure that pertains to their industrial customers. On the wastewater side, 66 percent have a separate rate structure for their commercial customers. Utilities that do not have separate rate structures for non-residential customers will sometimes set their block structures in a way such that industries that are large users pay a different price (usually lower) than smaller users. This may account for the systems in Figure 4 that have blocks that begin at 20,000 gallons/month or higher.

WHAT UTILITIES CHARGE THEIR RESIDENTIAL CUSTOMERS

Monthly Bills by Volume

Figure 5 and Figure 6 show the amount utilities bill residential water and wastewater customers, respectively, for a range of volumes determined on a monthly basis[2]. These calculations include base charges, consumption allowances, volumetric rates, and any water service-related surcharges that apply every month on the base or volumetric charges. The colored bars highlight what the middle 80 percent (between the 10th and 90th percentile) of charges are among the rate structures statewide for the consumption spectrum. Utilities that charge below or above the colored bars are charging less than or more than 90 percent of all other rate structures in the sample, respectively.

Figure 5: Monthly-Equivalent Residential Water Bills by Consumption (n=355)

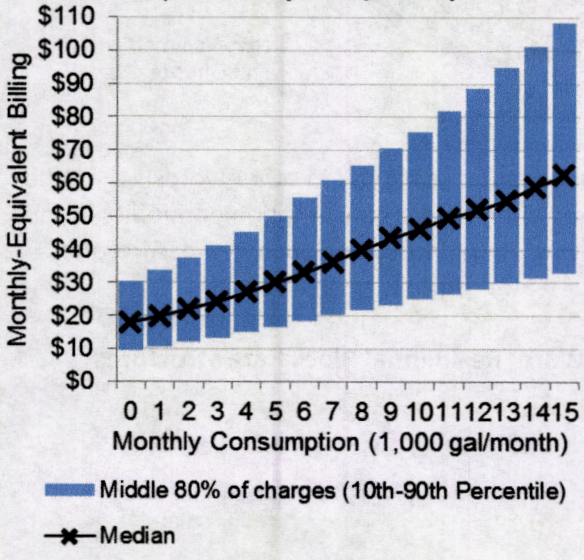
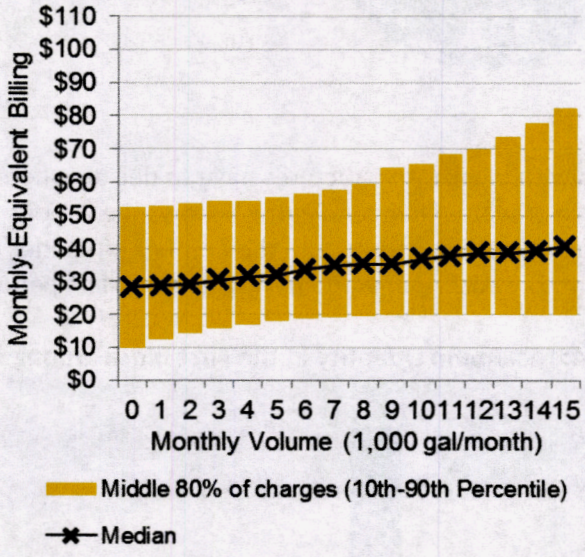


Figure 6: Monthly-Equivalent Residential Wastewater Bills by Volume Billed (n=136)



Determining a consumption point for rate comparisons

What a water and wastewater customer pays for service depends on their utility's pricing structure and the amount of services the customer uses. Water and wastewater pricing comparisons are often made focusing on one set consumption point (e.g. 7,000 or 10,000 gallons per month), but as Figure 5 and Figure 6 show, focusing on one consumption point can mask important variations in pricing, since the variation in utility pricing is much higher at higher consumption points than lower consumption points. Two utilities may be close to same price at 5,000 gallons, but radically different at 15,000 gallons per month.

Data from the Arizona Department of Water Resources indicate that average water use varies considerably across Arizona, with some utilities reporting residential accounts averaging as little as 5,000 or 6,000 gallons per month and others reporting in excess of 10,000 gallons per month based on per capita usage

[2] For utilities that bill on a non-monthly basis (bi-monthly or quarterly), charges have been calculated and presented on a monthly basis to allow for accurate comparison.

reporting[3]. The City of Phoenix has done extensive research on customer use and has found that even within a utility there is significant variation in usage among customers based on their outdoor watering habits, property attributes, plumbing fixtures and age of home. A relatively water efficient home in Phoenix that has an efficient residential irrigation system may use 9,000 gallons per month[4].

The EFC's research throughout the country has consistently shown that households that do not have substantial outdoor watering use on average approximately 5,000 gallons per month. Typical household use in drier climates where households irrigate even small areas of land can be much greater. This report presents residential prices at varying consumption points with:

- 5,000 gallons per month serving as an indicator of basic water needs,
- 10,000 gallons per month serving as an indicator for the typical median water customer in many utilities across Arizona based on reported usage to the state,
- 7,500 gallons per month as the mid-point[5] for water use and that is consistent with data from past reports, and
- 5,000 gallons per month of billed wastewater usage as an indicator of a typical wastewater customer.

Statewide median water and wastewater rates

The median monthly water bill across all 355 water rate structures charged for zero gallons of water (effectively the base charge) is $18.00, $30.09 for 5,000 gallons, $38.13 for 7,500 gallons, and $46.35 for 10,000 gallons.

The median monthly wastewater bill among all 136 wastewater rate structures charged for a volume of zero gallons is $28.37, $31.98 for 5,000 gallons, $35.11 for 7,500 gallons, and $36.74 for 10,000 gallons. Median wastewater bills are higher than water bills at zero and 5,000 gallons per month, but are lower at 10,000 gallons.

Calculating what individuals pay for combined water and wastewater services is difficult, as many utilities provide only water or wastewater service but not both. Some areas of the state receive water service from one provider and wastewater service from another provider, and in other areas, customers with one utility service may rely on a decentralized source (e.g. private wells or septic tanks) for the other service. For the 84 rate structures from utilities that provide both services, the median monthly combined bill for zero gallons is $44.44, $56.82 for 5,000 gallons, $63.84 for 7,500 gallons, and $73.86 for 10,000 gallons.

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[3] Arizona Department of Water Resources, AMA Planning & Data Management Section, 2013 Annual Water Withdrawal & Use Reports.

[4] City of Phoenix Water Department.

[5] The model used in this survey to calculate household expenditures from the details of rate structures was designed to calculate the monthly price at even 1,000 gallon increments. Therefore, the monthly charges interpolated at the 7,500 gallon point are close approximations but not exact calculations of actual charges at that volume.

Observations of note

1) Economy of scale is evident for water services, but not as strong for wastewater services. Table 3 shows that the median water bills among utilities serving different population sizes indicate an apparent economy of scale since larger utilities are generally charging lower water prices. Likewise, median wastewater bills are lower among utilities serving more than 5,000 people than among smaller utilities. However, the correlation between lower bills and higher service populations is not as strong with the wastewater bills as it is with water bills.

Table 3: Median Water and Wastewater Monthly Bills at 5,000 gallons/month, by Utility Size

	Water Rate Structures		Wastewater Rate Structures	
	Total Number of Structures	Median Monthly Bill at 5,000 gal/mo	Total Number of Structures	Median Monthly Bill at 5,000 gal/mo
All Rate Structures	***355***	***$30.09***	***136***	***$31.98***
By Service Population*				
1 – 999	169	$34.35	13	$35.12
1,000 – 2,499	52	$30.85	13	$29.50
2,500 – 4,999	30	$29.76	8	$36.20
5,000 – 9,999	21	$25.22	8	$26.17
10,000 – 24,999	29	$28.76	11	$28.04
25,000+	35	$23.72	27	$28.67

* Service population is estimated for 338 out of the 407 rate structures analyzed.

2) Differences in rates charged by utility type are difficult to distinguish due to various factors. Table 4 shows that municipal utilities generally have lower water and wastewater bills than other service providers (except for Sanitary Districts that have lower wastewater charges), possibly because the population density is highest for municipal utilities, which translates into lower per customer costs (and therefore bills) for distribution and collection. Conversely, for-profit water utilities, whose rates are regulated by the Arizona Corporation Commission, are somewhat higher than municipal rates, and Domestic Water Improvement Districts, established by counties in Arizona, are significantly higher. We also note that median bills of for-profit wastewater utilities are significantly higher than those of municipal utilities; however, the size of these utilities makes direct comparisons problematic, as municipal systems tend to be much larger than for-profit and other types of systems.

Table 4: Median Water and Wastewater Monthly Bills at 5,000 gallons/month, by Utility Type

	Water Rate Structures		Wastewater Rate Structures	
	Total Number of Structures	Median Monthly Bill at 5,000 gal/mo	Total Number of Structures	Median Monthly Bill at 5,000 gal/mo
All Rate Structures	***355***	***$30.09***	***136***	***$31.98***
By Utility Type				
Municipality	67	$24.20	69	$28.70
County/District	47	$41.25	10	$36.84
Authority/Sanitary District	1	$28.00	17	$25.00
Association/Co-Op/Non-Profit	19	$36.35	0	--
For-Profit	221	$29.80	40	$43.10

3) High water users will pay more if served by a smaller utility than a larger utility.

The variation among the price charged to customers by different sized utilities and different types of utilities depends on the amount of service used by the customers. Table 5 presents the variation for water service bills at different consumption points. Customers that use larger amounts of water (10,000 gallons) and are served by small utilities pay much more than those served by large utilities ($17/month difference in the median). The difference is significantly less for customers who use less water.

Table 5: Median Water Monthly Bills at 0, 5,000, and 10,000 gallons/month, by Utility Size

	Total Number of Structures	Median Water Monthly Bill at 0 gal/mo	Median Water Monthly Bill at 5,000 gal/mo	Median Water Monthly Bill at 10,000 gal/mo
All Rate Structures	***355***	***$18.00***	***$30.09***	***$46.35***
By Service Population*				
1 – 999	169	$19.00	$34.35	$51.25
1,000 – 2,499	52	$19.75	$30.85	$48.25
2,500 – 4,999	30	$18.20	$29.76	$47.21
5,000 – 9,999	21	$16.90	$25.22	$36.42
10,000 – 24,999	29	$17.00	$28.76	$39.80
25,000+	35	$14.19	$23.72	$34.26

* Service population is estimated for 336 out of the 355 water rate structures analyzed.

4) Purchase water systems that buy at least a portion of their water from another water system (either surface water or groundwater) charge the highest rates, followed by groundwater and then surface water.

Table 6 shows the median water charge for 7,500 gallons/month based on the type of water supply. The costs of treating water are highly dependent on the type of water supply. In general, withdrawing and treating water from surface supplies costs more than withdrawing and treating groundwater; however, there are several factors in Arizona including the need to do supplemental treatment for Arsenic, that increase the cost of groundwater sources. In Arizona, the median price charged to customers by utilities relying on surface water is considerably lower than for groundwater systems. This could be due to the fact

that surface water systems tend to be much larger than groundwater systems (average 130,500 people for surface water versus 7,300 people for groundwater systems in this survey sample). Table 6 also shows that utilities that purchase water unsurprisingly charge higher rates than utilities that treat their own water supplies, since purchase systems often must account for their own operational costs in addition to the costs of the supplier treating the water.

Table 6: Median Charge for 7,500 gallons/month for Water Systems Based on Type of Water Supply

	Water Rate Structures	
	Total Number of Structures	Median Monthly Bill at 7,500 gal/mo
All Rate Structures	***355***	***$38.35***
By Water Supply Type		
Groundwater	289	$38.61
Surface Water	29	$29.00
Purchase*	18	$48.95

* "Purchase systems" are those that buy at least a portion of their water from another water system, which could be either surface water or groundwater.

Households Pay Less than the Reported Median or Average Charges Across Utilities

Most large sample rate surveys focus on what utilities charge and present results in terms of the amount that the median utility charges (i.e. half charge more, half charge less) or the average amount charged by all utilities (i.e. adding all the charges together and dividing by number of utilities). The median charged by all utilities can differ from the average, sometimes significantly, based on the distribution of charges.

It is important to note that neither the median nor the average charged by all utilities is a good indicator of what "the average" Arizona resident pays, because the prices charged by small utilities are weighted as much as those charged by large utilities. Many more customers are served by larger utilities that, in general, have lower rates. Therefore, we used service population numbers from EPA's SDWIS database to calculate a weighted average customer water bill for comparison. In this survey, water rates were identified for the primary service areas of 306 utilities statewide that were matched with service population estimates. The median water charge among those utilities was $38.43 and the average water charge among them was $41.82 for 7,500 gallons of water. However, based on a population-weighted average, the average water customer in Arizona actually pays $25.87 for 7,500 gallons[6].

[6] This analysis could not be performed for wastewater bills due to lack of data on wastewater service population estimates.

Historic Trends in What Utilities Charge

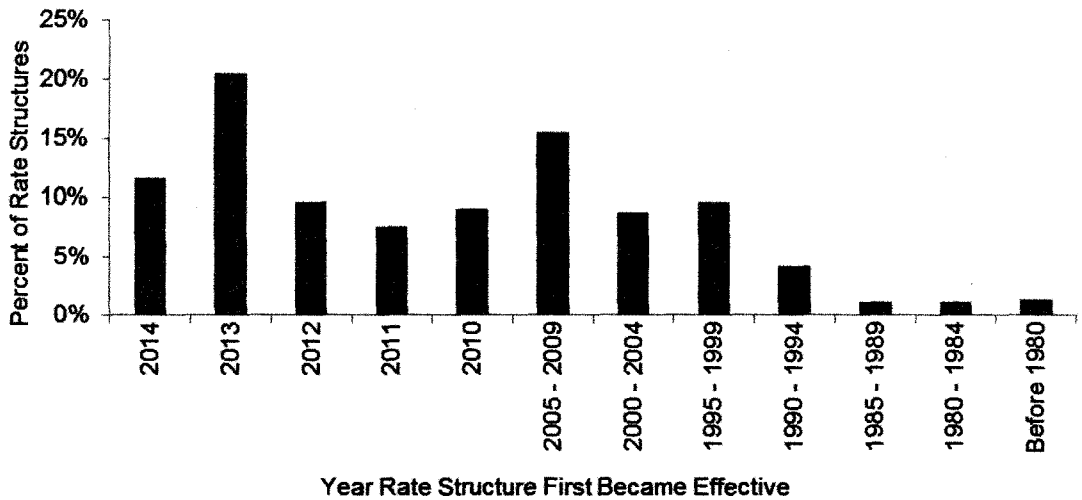
WIFA and Raftelis Financial Consultants have carried out detailed rate surveys in the past; however, comparing data from the current survey with those surveys must be done carefully. Past rate surveys involved the collection of questionnaires rather than solely the collection of rate structures as was done this year. As a result, the past surveys included more information on other aspects of utility management, but information from fewer utilities. If a utility did not respond in a given year, but had responded in a previous year, the previous response was used. This year's new method of collecting rate sheets promises to continue to provide a higher quality and quantity of data, and allow for trend analysis in the coming years. Table 7 presents the results of the 2012 rate survey compared with results from this rate survey.

Table 7: Median and Average Utility Water and Wastewater Charges in Arizona in 2012 and 2014

	2012 Survey	2014 Survey (373 utilities)
Median water charge for 7,500 gallons/month	$34.39	$38.35
Average water charge for 7,500 gallons/month	$38.14	$41.45
Median wastewater charge for 5,000 gallons/month	$27.58	$31.98
Average wastewater charge for 5,000 gallons/month	$30.74	$34.95

Many rate sheets include information concerning the effective date of current rates. This provides an interesting historic perspective on rate setting. Figure 7 shows the calendar year in which the rate structures (current as of May 2014) were first instated. While 42% of the rate structures were instated in the last three calendar years, a large number of utilities have not changed rates in the past ten years: 26% of rate structures are at least 10 years old, and 8% of the rate structures were unchanged for at least 20 years. Perhaps not surprisingly, only 40% of utilities that have not changed rates in at least 15 years were able to generate enough operating revenues to exceed their operating expenses in a recent fiscal year, compared to 51% of utilities that have changed rates in the last five years (since 2010).

Figure 7: In What Calendar Year were the Current (May 2014) Rate Structures First Instated? (n = 355)



CONSERVATION PRICING SIGNALS

Different prices and pricing structures provide customers with different financial incentives to conserve or invest in water efficiency. A residential customer with a large lawn may be more likely to convert to a xeriscape low water lawn if they have to pay $20 per thousand gallons rather than if they pay $3 per thousand gallons. This report does not attempt to study the customer water use behavior associated with different prices, but the results of the survey do allow for the detailed presentation of actual pricing signals experienced by customers across the state. How they react to those signals depends on many factors including income, education, and housing attributes.

For households that do not use much outdoor water, the price per thousand gallons at the 5,000 gallon point is a good indicator of the relative size of the pricing signal they encounter. Among the 355 water rate structures in the sample, the median price for the next 1,000 gallons (not including base charges) at the consumption level of 5,000 gallons/month is $2.80 per 1,000 gallons. Figure 8 shows the signficant variation in this signal across the state, with some utilities charging more than $10 per 1,000 gallons and others charging as little as $1 per 1,000 gallons.

Most of the wastewater rate structures are non-volumetric, providing no marginal price for an increase in volume from 5,000 gallons to 6,000 gallons/month. In such rate structures, the customers will only receive a price signal to encourage conservation through the water bill alone, but the signal is diluted by the presence of a large, non-volumetric wastewater charge that does not change regardless of how much the customer cuts back on water use. Among the wastewater rate structures that are volume-based, the marginal wastewater price for the next 1,000 gallons of water volume is generally lower than that of the marginal water price.

Figure 8: Marginal Price for the Next 1,000 Gallons at 5,000 gallons/month for 355 Water and 136 Wastewater Rate Structures

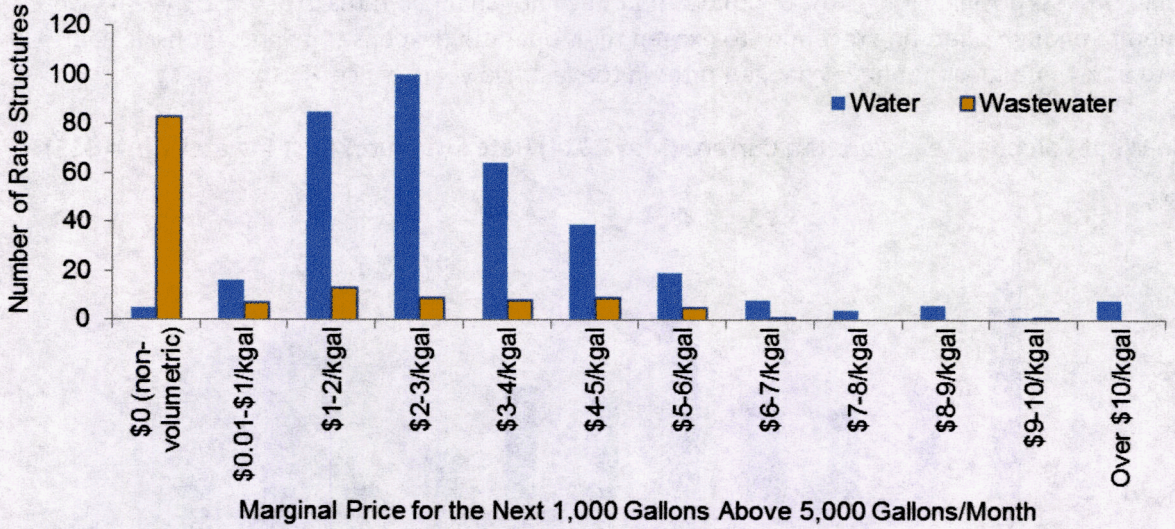
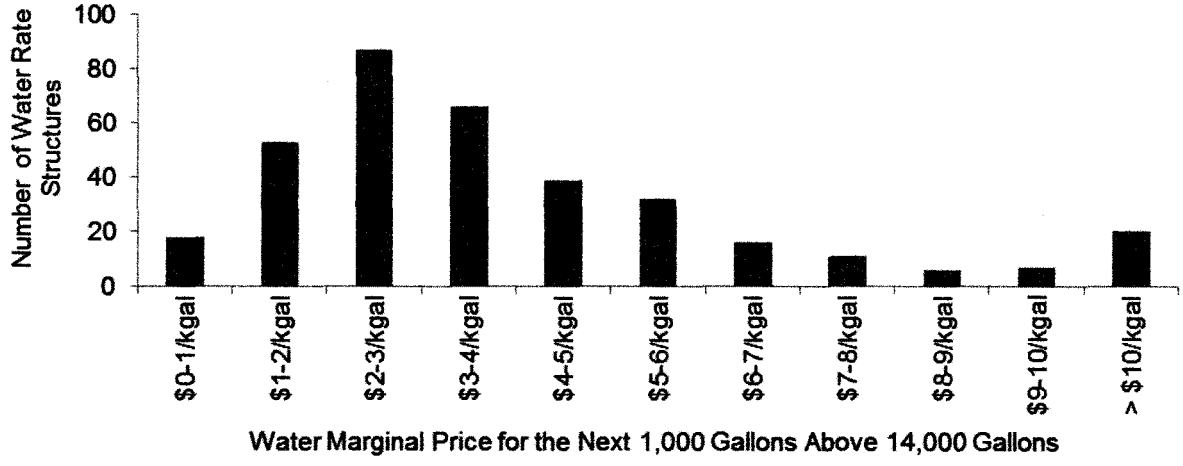


Figure 9 and Figure 10 show other types of pricing signals experienced by residential customers. Figure 9 shows the water marginal price at 14,000 gallons per month. This can be thought of as the signal to someone who waters their lawn to reduce their outdoor water demand, as most residential irrigators use more than 10,000 gallons/month.

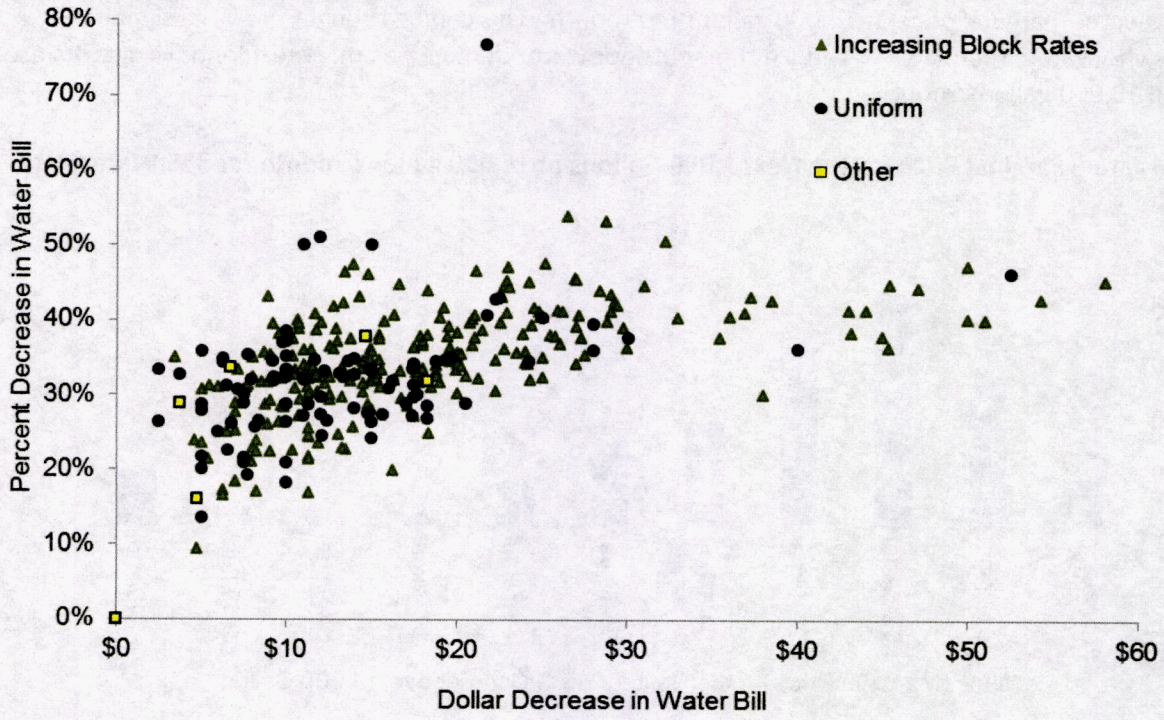
Figure 9: Water Marginal Price for the Next 1,000 Gallons at 14,000 gallons/month for 355 Water Rate Structures



Finally, Figure 10 shows pricing signal in another format: the financial reward that a customer receives in terms of a reduction in their water bill when they halve their monthly water use from 10,000 gallons (slightly above average in Arizona) to 5,000 gallons (the average in many more humid regions of the country). The reduction in the monthly water bill acts as a price incentive to encourage conservation, and is measured both in terms of absolute bill savings and as a percentage of bill reduction.

Figure 10 shows that there are some utilities that reward customers substantially both in terms of dollars and bill reduction percentage for making this reduction, whereas other utilities provide relatively little incentive. Interestingly, while some increasing block rate structures clearly send very high conservation pricing signals, there are many increasing block rate structures that send a weaker pricing signal than some uniform rate structures. Put another way, a utility with a uniform rate structure that charges a high price for water, say $7.00 per thousand gallons, sends a significantly higher pricing signal than a utility that charges $4.00 per thousand gallons even if the utility has an increasing block rate structure. It is possible to design a simple, uniform rate structure to incentivize water conservation as well as, or sometimes better than, many increasing block rate structures currently in use.

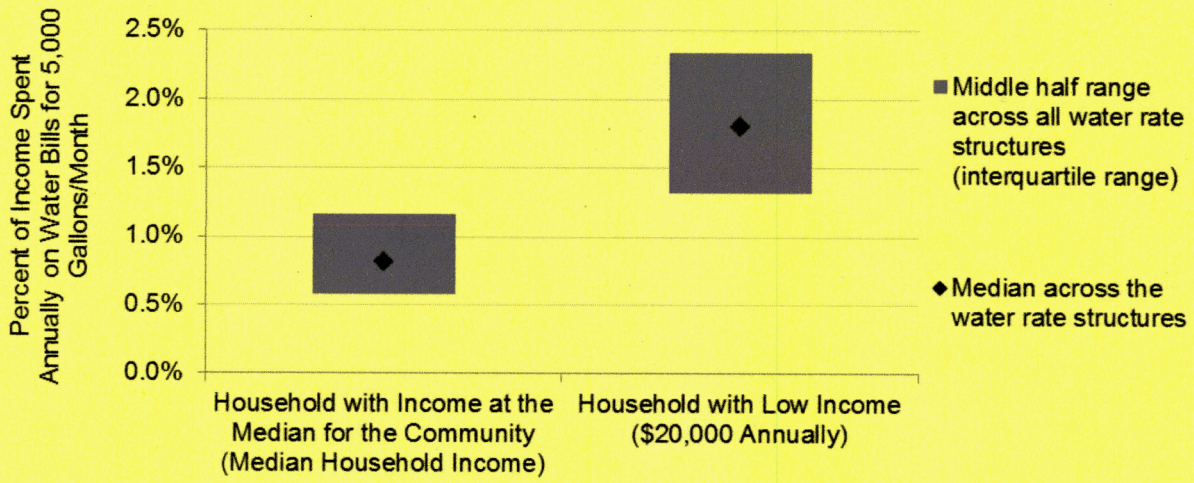
Figure 10: Reductions in the Water Bill for Decreasing Consumption from 10,000 to 5,000 Gallons/Month



WHAT IS THE FINANCIAL IMPACT ON CUSTOMERS?

How much a residential customer would have to spend annually on water bills, relative to their household income[7], is a commonly used metric to assess the affordability of rates. There are many versions of this metric, which divides annual bills at one consumption point by the household income level of interest. The most common metric is to divide the annual bill at near the average residential consumption level by the median household income of the community ("percent MHI"). The first bar in Figure 11 displays this metric, using 5,000 gallons/month to approximate the basic indoor demand (winter average) of residential customers in Arizona. This metric has numerous shortcomings, but it does show the variation in financial impact across the state. In a quarter of the utilities, customers making the median household income would spend less than 0.6% of their income annually for 5,000 gallons/month of water, whereas in another quarter of the utilities, those median household income customers would spend more than 1.2% of their income. Figure 11 also shows what percentage of income a household that makes $20,000 per year would pay for the same volume of water. Not surprisingly, the water bills amount to greater percentages of this low household income level. This method of showing how two affordability metrics compare across the state shows that while there are some utilities that have customers at the median income paying relatively little, these communities still have water prices that place a greater burden on lower income customers. Figure 11 displays financial impacts for customers that use relatively low amount of water. Larger low-income families, or families that live in substandard housing stock with older appliances that are less water efficient, may end up paying an even higher percentage of their income for essential water service.

Figure 11: How Much a Residential Customer Would Spend of their Household Income on Water Bills at 5,000 Gallons/Month (n=345)



[7] The local community's income data can be obtained from the U.S. Census Bureau.

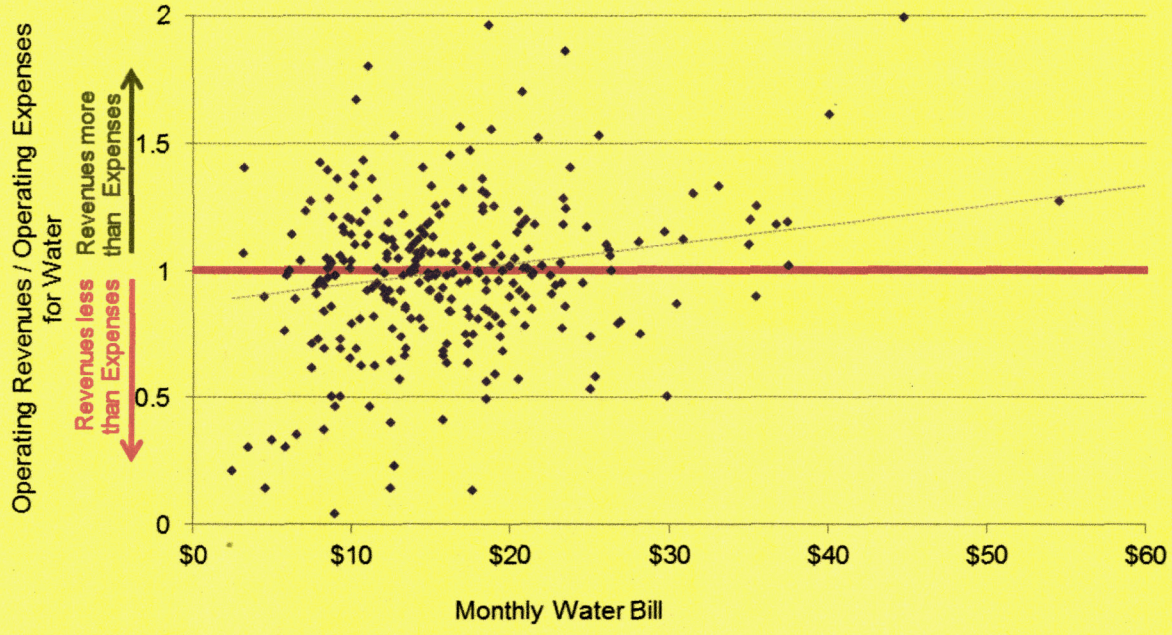
ARE PRICES COVERING ALL COSTS?

Most of this report focuses on how utility rates and rate structures compare to each other across the state, but the question that arguably deserves even more attention is how rates compare to costs for an individual utility. This question is certainly critical to organizations such as WIFA that promote financial stewardship.

In truth, comparing rates across the State of Arizona or among specific utilities is complicated by the variation in the extent to which utilities charge the full cost of providing service. Rates that provide enough revenue to balance an annual budget do not necessarily provide enough revenue to cover long term capital and maintenance needs. The resulting prices in Arizona, and in many other states where the EFC has surveyed, end up being less than what would be needed to cover the full cost of service provision. Figure 12 shows the monthly water or wastewater charge for 5,000 gallons in May 2014 plotted against the ratio of operating revenue to operating expenses from either Fiscal Year 2012, 2013 or 2014, based on the latest available data. This ratio helps determine whether an entity is operating at a financial loss, financial gain, or is breaking even. The ratio accounts for all operating expenses, including depreciation, but does not include direct capital expenditures or debt service payments. Financial data were obtained directly from utilities' audited financial statements.

Figure 12 shows that many water utilities are not covering their operating expenses, making it difficult or impossible to rehabilitate aging infrastructure, finance system improvements and expansion, and engage in proactive asset management. It is interesting to note that the water utilities that are operating at a financial loss are not always charging low water rates; even some utilities with high rates are operating at a financial loss. Nevertheless, water utilities that charged lower water rates in 2014 (to the left of the graph) were slightly more likely to operate under a financial loss (below the horizontal line on the graph), as indicated by the rising trend line.

Figure 12: Utilities with Higher Water Bills, on Average, Have Healthier Water Operating Ratios than those with Lower Bills (n=275)



While there may be compelling social and political reasons why a utility may choose not recover all their costs through their rates, transparent and accurate comparative information has the potential to provide policy makers with a more complete view of their situation. Studies like the one summarized in this report may lead to rate setting that better incorporates financial sustainability and that ultimately provides the revenues needed by utilities to protect the environment and their customer's public health.

About this Report

This report on water and wastewater rates and rate structures in Arizona was compiled by the Water Infrastructure Finance Authority of Arizona (WIFA) and the Environmental Finance Center (EFC) at the University of North Carolina at Chapel Hill. The source data (rate sheets and annual financial reports) were collected by WIFA and the EFC and data from these source documents were input into a database by the EFC for the purposes of creating this summary report, as well as the rates tables and online interactive dashboard tool. For reports and other information on water and wastewater rates in other states, including, in some cases, more in-depth analysis on the relationships between rates, rate structures, system characteristics and policies including cost-recovery, conservation, and affordability, please visit the EFC's website at http://www.efc.sog.unc.edu. In addition to survey results, you will also be able to access a free, interactive Rates Dashboard for Arizona, which facilitates rate comparisons among utilities and gives benchmarks for every rate structure in this Survey.

Data entry of rates and financial data by the EFC was funded by WIFA, who also funded the summary report, rates tables, and online, interactive, rates dashboard tool.